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ABSTRACT

Analysts of U.S.-Soviet balance of power usually focus on relative military strength. But other factors determine a country's overall power and influence. Among the most basic is a country's capacity to feed its people. By this measure the Soviet Union appears to be in deep trouble. Massive spending has increased Soviet military strength in recent years, but the country has become weaker agriculturally. While the two superpowers now appear roughly equal in military strength, the advantage in agriculture has shifted dramatically toward the United States. The U.S. exportable food surplus is climbing, while Soviet dependence on food imports is growing. The dramatic shift in the agricultural balance of power between the two countries has been decades in the making, but contrasting food surpluses/deficits have been highly visible only in the last decade or so. As deterioration of Soviet agriculture continues, the need to import food will become even greater. The relationship between grain flow from the United States to the Soviet Union constitutes a new economic tie between the two countries, one that could eventually transform their political relations as well. (JN)

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U.S. and Soviet Agriculture: The Shifting Balance of Power

Lester R. Brown

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Analysts of the U.S.-Soviet balance of power usually focus on relative military strength—the number of tanks, planes, nuclear warheads and other items in the so-called strategic balance. But many other factors determine a country's overall power and influence. Among the most basic is a country's capacity to feed its people. By this measure the Soviet Union appears to be in deep trouble. 5

Massive spending has increased Soviet military strength in recent years, but the country has become weaker agriculturally. While the two superpowers now appear roughly equal in military strength, the advantage in agriculture has shifted dramatically toward the United States. The U.S. exportable food surplus is climbing, while Soviet dependence on food imports is growing.

This year the Soviet Union will try to import 46 million tons of grain, more than any country in history. Nearly one-fourth of all Soviet grain, feeding both people and livestock, will come from outside sources. Over one-half of this imported grain will come from the North American breadbasket, most of it from the United States.[1]

The Soviet economy is a planned economy, but these grain imports were not planned. They will fill part of the 68 million ton gap between the 1982 target of 238 million tons of grain and an actual harvest of some 170 million tons.[2] In the past the Soviets blamed bad weather for their shortfalls, but this explanation is beginning to wear thin. Recently the Soviet leadership has acknowledged failures within the agricultural system itself.

I am indebted to my colleague Edward Wolf for his assistance with the research and analysis underlying this paper.

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Evidence now indicates that the Soviet Union has moved beyond the good year/bad year oscillations of the late sixties and early seventies, when it imported grain only after poor harvests, and must now import massive quantities of grain continuously. The fourth consecutive massive crop shortfall in 1982 signals a broad-based deterioration of Soviet agriculture that will create food shortages well into the future.

In contrast to poor harvests in Third World countries, which can lead to starvation, poor Soviet harvests largely threaten the supply of livestock products. The Soviet food problem is a shortage of meat, not bread. The issue, therefore, is not starvation but worker morale, a question of whether the system can provide the quality of diet that Soviet leaders and planners since Krushchev have promised, and that Soviet citizens have come to expect.

The dramatic shift in the agricultural balance of power between the United States and Soviet Union has been decades in the making. But contrasting food surpluses and deficits have been highly visible only in the last decade or so. As recently as 1970 both countries were exporting grain—the United States 38 million tons and the Soviet Union eight million tons. By 1981, however, U.S. grain exports had jumped to a staggering 115 million tons and the Soviets were importing 43 million tons.[3]

Not surprisingly, these huge food deficits trouble the Soviet leadership. In the Eleventh Five-Year Plan (1981-85), released a year late at the November 1981 meeting of the Central Committee of the Soviet Communist Party, General Secretary Leonid Brezhnev said food was "the central problem of the whole Five-Year Plan."[4] His discussion of Soviet agricultural goals and prospects was extraordinarily dispirited, a far cry from Krushchev's taunting "we will bury you" economic rhetoric of a quarter-century ago.

As the deterioration of Soviet agriculture continues, the need to import food will become even greater. Already the flow of grain from the United States to the Soviet Union is on the verge of being the largest ever between two countries, about to eclipse the current U.S. flow to Japan. The long line of ships that now connects American farms with

"The long line of ships that now connects American farms with the dining tables of the Soviet Union constitutes a new economic tie between the two countries."

the dining tables of the Soviet Union constitutes a new economic tie between the two countries, one that could eventually transform their political relations as well.

Diverging Production Trends

A country's level of food production is determined in part by its natural resource endowment—area of arable land, inherent soil fertility, rainfall, irrigation potential and growing season—and in part by how wisely it manages its resources. The natural resource base indicates agricultural potential; effective management is the key to realizing that potential.

In one major natural resource—area of arable land—the Soviet Union enjoys a wide edge over the United States. The Soviets currently plant over 500 million acres, exceeding by nearly half the 350 million acres planted annually in the United States. Measured only by its cropland area, the Soviet Union is in a class by itself among world food producers.[5]

The Soviet cropland advantage of 150 million acres, however, is partly offset by climatic differences favoring the United States. Whereas most U.S. cropland lies between 34 and 45 degrees north latitude, Soviet cropland lies farther north, mostly between 48 and 55 degrees. In much of the Soviet Union, as in Canada, which is similarly situated, winter grain crops cannot survive the harsh winters. Over half of the wheat, the crop dominating Soviet agriculture, is spring wheat—wheat planted in May and harvested in September. This northerly location also means that the Soviet Union has much less potential than the United States for double cropping winter grains, such as wheat and barley, with summer crops such as soybeans.[6]

Rainfall differences also offset the Soviet advantage in arable land. The geographic distribution of rainfall in the United States is better than in the Soviet Union, where heavier rainfall is in the north while the cropland with a longer growing season is in the semiarid south. Indeed, the south central Soviet Union is largely semiarid, similar to the southwestern United States. The geographic mismatch between

Figure 1: U.S. and Soviet Grain Production, 1950-1982

rainfall and land, a perpetual source of frustration for Soviet agricultural planners, has led to an intense effort to develop irrigation potential in the southern semiarid regions.

Analyzing grain and livestock production trends reveals much about the two economic systems. Although U.S. grain output from 1950 through the early seventies was consistently higher than in the Soviet Union, rising trends in overall grain production in the two countries during this period were remarkably parallel. (See Figure 1.) A simple statistical comparison of grain production trends in the two countries, however, masks the different intent behind each country's food pro-

"For U.S. farmers, 1981 marked the first time they doubled the output of their Soviet counterparts—331 million tons of grain to 165 million tons."

duction efforts. From 1950 to 1972, when U.S. farmers produced more than commercial markets at home and abroad could absorb, national agricultural policies attempted to constrain production to avoid burdensome surpluses. These efforts took the form of cropland diversion programs that paid farmers to idle in some years as much as one-seventh of U.S. cropland.[7] The Soviets, meanwhile, were striving for maximum production each year. In effect, though both countries moved forward in the postwar agricultural competition, the Soviets were travelling at full speed while the United States was applying brakes.

Since the mid seventies, agricultural trends in the two countries have diverged sharply. Because of the massive Soviet purchase of U.S. wheat in 1972 and tight world grain supplies in subsequent years, the U.S. government removed most of its grain production constraints. At this point American farmers responded enthusiastically to expanded opportunities in the world market. Between the early seventies and the early eighties they boosted grain output from 215 million tons per year to over 300 million tons per year. Meanwhile, in the Soviet Union, production growth lost momentum during the seventies. After peaking during the years 1976 to 1978 it began to decline. For U.S. farmers, 1981 marked not only a record harvest, but also the first time they doubled the output of their Soviet counterparts—331 million tons of grain to 165 million tons.[8]

With the notable exception of production from an additional 20 million hectares of Soviet Virgin Lands planted during the fifties, crop production gains in both countries have come almost entirely from raising land productivity. This effort to raise land productivity has been the U.S. farmers' biggest success. Between 1950 and 1982, their grain yield per hectare climbed from 1.6 metric tons to 4.2 metric tons, nearly tripling over the 32-year span. Soviet gains, meanwhile, went from 0.8 to 1.4 metric tons per hectare, a gain of 75 percent. The United States chalked up an astonishing 2.6 tons per hectare yield increase during this period compared with only 0.6 tons for the Soviets.[9] (See Figure 2.)

In this paper, land area is most often expressed in acres, while yields are expressed in metric tons per hectare. One hectare equals 2.47 acres.

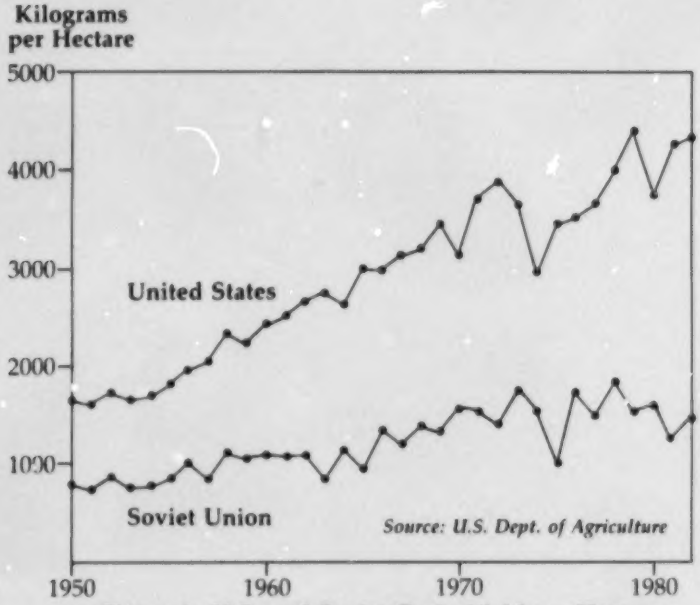

Figure 2: U.S. and Soviet Grain Yield per Hectare, 1950-1982

The key to the extraordinary U.S. gain is corn, which regularly accounts for one-half to two-thirds of the grain harvest. Starting with a crop already made highly productive by the New World Indians before Columbus arrived, modern U.S. corn breeders have created hybrids that led to additional dramatic increases. The tripling of the U.S. corn yield per hectare over the past generation is largely the result of these hybrid varieties responding to heavy applications of chemical fertilizer.

After land productivity, fertilizer productivity ranks high as an indicator of overall agricultural efficiency. Even though detailed data on

fertilizer application by crop in the Soviet Union are not available, broad comparisons can be made between the two farm economies by relating fertilizer use to grain production, which dominates land use in both countries. Measured in terms of nutrient content, the Soviets used 26 million tons of fertilizer in 1981 and harvested 165 million tons of grain, while the United States used 21 million tons and harvested 331 million tons of grain. Thus, the Soviets are producing roughly six tons of grain per ton of fertilzer compared with 16 in the United States. Assuming that the share of fertilizer used on crops other than grain does not vary widely between the two countries, these ratios indicate a markedly more efficient use of fertilizer in the United States.[10]

Market discipline is one reason for higher fertilizer efficiency in the United States. For a U.S. farmer, failing to carefully match fertilizer use and crop need leads to declining profits. In the Soviet Union, with no market forces to impose discipline, farmers often use fertilizer inefficiently, if not wastefully. In addition, the particular type of fertilizer produced in the Soviet Union is often determined by the ease of shipment and delivery, not by its ease of application or usefulness to farmers. Beyond this, many farmers cannot easily be reached with fertilizer shipments by existing rail or road networks, and others lack the appropriate fertilizer application equipment. For these and other reasons, the Soviets have lost the advantage gained by massive investments in fertilizer manufacture during the three Five-Year Plans (1966-1980) under Brezhnev, which pushed Soviet fertilizer consumption ahead of the United States.[11]

The high grain yield per hectare makes U.S. agriculture comparatively more efficient than Soviet agriculture in several ways. It enhances the productivity of other farm resources, including labor, equipment, pesticides, fuel and seed. With low grain yields the Soviets must till and harvest far more land, requiring more equipment and using larger quantities of costly liquid fuels. When oil cost two dollars per barrel inefficient fuel use was relatively unimportant, but at 30 or more dollars per barrel this is no longer true.

Soviet seed use too is inordinately high because of the heavy reliance on small grains, which yield far less with a given amount of seed than

does corn. In the Soviet Union, where wheat accounts for half of all cereals produced, a bushel of wheat seeds an acre and typically yields about 20 bushels. In the United States, however, a bushel of corn easily seeds five acres, yielding 100 bushels per acre for a total of 500 bushels. These yield/seed returns of 20 to 1 for Soviet wheat and 500 to 1 for U.S. corn, representing the extremes of the yield/seed spectrum, show why the Soviets must use much more seed than the United States. In recent years, Soviet farmers have used some 28 million tons of grain or 16 percent of their harvest for seed, compared with only six million tons or 2 percent in the United States.[12]

But even these impressive U.S. gains in grain output and productivity do not tell the whole story because they fail to show the enormous shift of U.S. farm resources to the production of soybeans, a crop now planted on 70 million acres and rivaling wheat and corn in its claim on U.S. cropland.

Since the fifties U.S. soybean output has expanded in response to increased world demand for livestock products and the associated demand for protein feedstuffs generated by the economic prosperity of the postwar era. While the United States chose soybeans to meet the need for protein supplements in livestock rations, the Soviet Union, too far north to plant many soybeans, turned to sunflowers. U.S. soybean output, averaging eight million tons annually in the early fifties, climbed steadily for the next three decades, reaching 63 million tons in 1982. Meanwhile, sunflower seed production in the Soviet Union increased more slowly, reaching a peak of 7.4 million tons in 1974. Since then Soviet sunflower production has declined, falling below five million tons in 1982.[13] (See Figure 3.) As a result, Soviet livestock producers are unable to balance the caloric energy and protein content in rations for their livestock and cannot achieve maximum efficiency in converting grain to meat.[14]

U.S. soybean production is much more than a domestic success story. World soybean output, 60 percent of it from the United States, now tops that of all other oilseeds—sunflower seed, peanut, cottonseed and rapeseed—combined. Introduced into the United States from China as a source of vegetable oil, the soybean has been transformed

"The United States is not only the world's breadbasket, but its vast exports of corn and soybeans make it the world's feedbag as well."

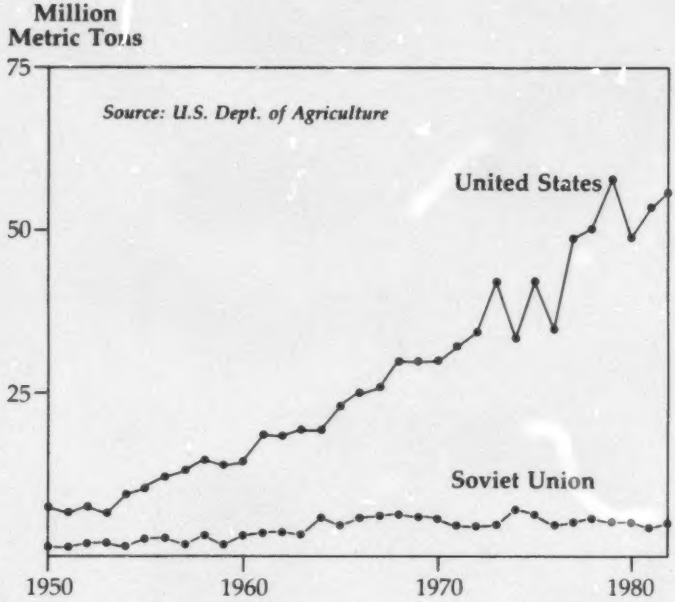

Figure 3: U.S. Soybean Production and Soviet Sunflower Seed Production, 1950-1982

within a generation from a curiosity to a major crop, a leading U.S. farm export and a key source of protein in global livestock rations. The United States is not only the world's breadbasket, but its vast exports of corn and soybeans make it the world's feedbag as well.

Because industrial societies convert most of their grain harvest into livestock products, comparisons of agricultural productivity do not stop with grain and soybeans. In the United States, livestock and poultry producers, responding to the postwar growth in demand for meat products, nearly doubled output between 1950 and 1982. By

1982 U.S. farmers were producing over 27 million tons of meat per year. Remarkable gains in broiler production efficiency pushed poultry output ahead of pork production by the mid seventies, and close to that of beef. As a result, Americans now consume roughly equal amounts of beef, poultry and pork.[15]

The Soviets, meanwhile, launched their own ambitious effort to boost livestock output in the late fifties. Between 1960 and 1980 the Soviets increased the use of grain for livestock and poultry feeding from 40 million tons to over 120 million tons, a remarkable gain and a major commitment of resources. Despite this tripling of feedgrain use, meat production only increased from 8.7 million tons to 15 million tons of meat for a population one-fifth larger than that of the United States.[16]

The Soviet shortcoming was not a failure to commit sufficient resources to livestock production, but the inability to use those resources efficiently. Grain use per capita in the United States and the Soviet Union today is roughly the same—800 kilograms per year, or four-fifths of a metric ton. While this yielded the typical U.S. consumer 121 kilograms of meat per year, the average Soviet consumer had only 56 kilograms, less than half as much. (See Table 1.)

Although comparable data are not available for both countries, some broad-brush calculations on the efficiency of grain fed to livestock are possible. In both countries grain is used to produce milk and eggs, as well as meat, but meat production claims the bulk of the feedgrain supply. In 1980, Soviet farmers fed livestock and poultry 120 million tons of grain to get 15 million tons of meat. Relating total feedgrain use to meat output alone shows that close to eight tons of grain were fed for each ton of meat produced. U.S. farmers, by contrast, fed 125 million tons of feedgrain to livestock and poultry and turned out 27 million tons of meat. This crude calculation suggests just under five tons of grain were used for each ton of meat produced.[17]

In addition to protein meal shortages and the resulting imbalance between calories and protein in feed that handicap Soviet livestock growers, Soviet livestock breeding has lagged far behind the West. The United States has long used different breeds of cattle for beef and

for dairy production, a tradition imported from England, whereas the Soviets still rely heavily on the same breeds for meat and milk.[18] The result is relatively inefficient production of both.

Table 1: U.S. and Soviet Meat Production Per Capita, 1980

	United States	Soviet Union
	(kilograms)	
Beef and Veal	44	26
Pork	36	19
Mutton	1	3
Poultry	40	8
Total	121	56

Source: USDA Foreign Agricultural Service and Economic Research Service.

Although the Soviet Union has half again as much rangeland as the United States, its climate is less favorable for beef production. Not only is the grazing season shorter, but cattle produced in the cold northern latitudes need more feed merely to keep warm, leaving less for weight gain. For this reason, large commercial feedlots in the United States are concentrated in the southern plains—eastern Colorado, western Kansas, Oklahoma and Texas.

For the United States the trends of the past three decades reveal a dramatic story of agricultural advance, one without precedent or parallel. For the Soviet Union production of most commodities is far above a generation ago and diets have improved, though well below Plan and even further below expectations. In contrast to some Third World countries, there is no hunger in the Soviet Union today; but Soviet agriculture is still far from a success story. Before the 1917 revolution, the Soviet Union was the leading supplier of grain to Europe. Today, it is the world's leading grain importer. Even more serious, recent declines in grain production may mark the beginning of a long-term deterioration of Soviet agriculture.

The Deterioration of Soviet Agriculture

16 The deterioration of Soviet agriculture is not confined to the production of grains alone. It permeates the entire agricultural sector, affecting crop and livestock products alike. Output of virtually all major crops—potatoes, sugarbeets, oilseeds, fruits, vegetables—and of livestock products has peaked and begun to decline in recent years. For most commodities the production peak came about 1978.[19] (See Table 2.)

Table 2: USSR: Production of Basic Agricultural Commodities, 1960-82[1]

Year	Grains	Meat	Milk	Potatoes	Vegetables	Fruit	Sugar
			(million metric tons)				
1960	123	8.7	61.7	84.4	16.6	4.9	5.7
1965	114	10.0	72.6	88.7	17.6	8.1	9.2
1970	179	12.3	83.0	96.3	21.2	11.7	8.8
1971	174	13.3	83.2	92.7	20.8	12.4	9.0
1972	161	13.6	85.2	78.3	19.9	9.6	8.0
1973	214	13.5	88.3	108.2	25.9	13.4	8.1
1974	186	14.6	91.8	81.0	24.8	12.4	9.6
1975	134	15.0	90.8	88.7	23.4	14.2	7.7
1976	214	13.6	89.7	85.1	25.0	15.3	7.7
1977	188	14.7	94.9	83.6	24.1	15.3	7.4
1978	229	15.5	94.7	86.1	27.9	14.4	9.8
1979	174	15.3	93.3	91.0	27.2	16.3	9.3
1980	182	15.0	90.6	67.0	25.4	14.6	7.8
1981[2]	165	15.2	88.5	72.0	25.6	14.5	7.2
1982[3]	170	14.6	83.3	82.0	24.8	14.2	6.4

[1]Peak production year for each commodity is underlined. [2]Preliminary.
[3]Worldwatch estimate based on preliminary data.
Source: USDA Economic Research Service.

Overall the 1982 Soviet grain harvest, estimated at 170 million tons, is down 26 percent from the peak production of 1978. Meat production, bolstered by imported feedstuffs, has fallen only 6 percent from the high of 15.5 million tons in 1978. Among meats, only poultry production, accounting for just one-seventh of meat consumption, has resisted this decline.[20]

The decline in meat production is closely parallel to that of milk. Milk production peaked in 1977 at 94.9 million tons. Production in 1982, at 83.3 million tons, is down over 12 percent from the 1977 high. Largely because of feed shortages, milk production per cow in the Soviet Union has fallen 10 percent since 1978; U.S. milk production per cow increased nearly 10 percent during the same period.[21] These diverging trends have widened the gap to the point that a typical U.S. dairy animal now produces nearly three times as much milk as her Soviet counterpart. The overall decline in Soviet milk production means shortages not only of fresh milk but of butter and cheese as well.

Production of the all-important dietary staple, potatoes, is also falling. The 1982 harvest of 82 million tons, though up from the two preceding years, was well below the peak output of the early seventies. Shortages of potatoes, traditionally an abundant foodstuff, and high potato prices in open markets underline the magnitude of this production shortfall.

Similar trends have affected fruit and vegetable supplies. Vegetable production peaked in 1978 at 27.9 million tons and has fallen 11 percent since then. Fruit production, which topped out in 1979, has dropped even more. Sugar production, almost all of it from sugar beets, peaked in 1974 at 9.6 million tons. Since then it has fallen by exactly one-third. Because of the broad-based decline in agricultural output in recent years, food rationing has been imposed in nearly a dozen cities.[22]

As noted earlier, the production of sunflower seeds, the main source of edible vegetable oil in the Soviet Union as well as the principal protein supplement for animal feed, peaked in 1978 at 7.4 million

metric tons. The long downward spiral since then has reduced output to 4.6 million tons in 1981. This 38 percent decline has forced the Soviets to expand imports of both protein meal for livestock and vegetable oil for cooking.[23] Perhaps more than any other major crop, sunflowers have fallen victim to plant pests, and more specifically to the inability of research scientists to breed disease and insect resistant varieties or to develop effective pesticides. One of the most virulent strains of broomrape, a root parasite and the most serious pest affecting the Soviet sunflower crop, is believed to be spreading. Broomrape, combined with ineffective weed control and spreading disease problems associated with reliance on a few varieties, have led to a reversal of the postwar rising yield trend that prevailed until the mid seventies.[24]

The deterioration of agricultural production in the Soviet Union is too pervasive to blame on weather, as Soviet officials are inclined to do. Just as production declines cut across almost every segment of Soviet agriculture, the shortcomings involve virtually every agricultural input and every phase of agricultural management.

Analysts usually look first at the adequacy of investment to explain deficiencies in agricultural production. This certainly would have made sense in an earlier Soviet era. Despite the equal prominence given the hammer and the sickle in the Soviet flag, the sickle was neglected in the Stalinist development model that gave heavy industry top priority.

But such is no longer the case. In the fifties, Krushchev began to elevate agriculture on the Soviet list of priorities. Brezhnev put it front and center following his accession to power in 1964. During the past three Five-Year Plans (1966-1980), as well as the current Plan (1981-1985), investments have been heavy by almost any measure. Since 1966 Soviet investment in agriculture has dwarfed that of the United States. As a share of total Soviet investment, agriculture has claimed a whopping 27 percent in recent years.[25] Few countries, industrial or developing, have been able to commit such a large share of total investment to agriculture.

"Despite the equal prominence given the hammer and the sickle in the Soviet flag, the sickle was neglected in the Stalinist development model."

Since investment in agriculture has been heavy, several questions arise about Soviet agricultural shortcomings: Why is agriculture deteriorating on so many fronts? Why have production trends actually been reversed? And why is this deterioration occurring now?

Discussions of Soviet agriculture, whether by Soviet officials, the Soviet press or Western commentators, tend to focus on specific shortages and shortcomings, but these are commonly symptoms of a more fundamental problem—the nature of the system itself. Evidence now points to a basic conflict between a centrally planned and controlled agriculture and the evolution of a modern, highly productive agriculture. Centralized agriculture and Soviet Plan goals are incompatible. The more the Soviets try to modernize their agriculture, the more obvious the inherent contradiction will become.

Because traditional agriculture is largely self-contained, supplying its own draft power, seed and fertilizer, usually in the form of livestock manure, it is not much affected by central planning. But as agriculture modernizes it becomes ever more complex, requiring a range of off-farm physical inputs and support services and the authority to make on-the-spot decisions. Providing the appropriate inputs in the proper amounts and at the right time in response to continually changing conditions on the farm is virtually impossible with a centralized system. If the system fails, production suffers accordingly.

Traditional agriculture, with low but relatively stable productivity, has little need for agricultural research. But as agriculture modernizes and yields rise, research support must become more sophisticated simply to maintain new production levels. In the United States, for example, typical commercial wheat varieties last four years before they are overtaken by evolving strains of wheat rust or other pests, or replaced by newer, more productive varieties. Without research support, high-yield agriculture will gradually deteriorate, with yields eventually returning to traditional levels.[26]

Contrasting approaches to agricultural management in the Soviet Union and the United States are obvious when their respective agricultural structures are compared. In the Soviet Union, 500 million

acres of cropland are divided in roughly equal amounts between 20,800 state farms and 26,000 collective farms. Each state farm averages just over 13,000 acres and each collective farm about 9,000.[27]

In the United States, where 2.4 million farmers cultivate some 350 million acres, each farm averages 144 acres of cropland. Including grazing and forest land, the typical farm has close to 400 acres. As is often the case, however, these averages conceal a wide range of farm sizes. The 1974 census reported 225,000 farms with less than 50 acres of land. At the other end of the spectrum, there were 150,000 farms with a thousand acres or more. The vast majority of U.S. farmers—some two million—were in the 50 to 1,000 acre category.[28]

The Soviet Union employs a farm labor force of 26.1 million.[29] Of this group 46,800 are the managers of the state and collective farms. Even allowing for numerous assistant farm managers and other supervisory personnel, the bulk of the 26 million farm labor force are farm workers directed by the 46,800 farm managers, who in turn are directed from Moscow. By contrast, the U.S. farm labor force totals 3.7 million, only a small fraction of that in the Soviet Union. Of this total, 2.4 million are managers of family farms, mostly owner-operators, and fewer than 1.3 million are hired workers.[30]

In the highly competitive U.S. market economy these farm managers must excel to survive. The market is heartless in weeding out poor managers. While the floor price for major commodities may be determined in Washington by the level of price supports, the farmer is largely on his own. For decision making he draws heavily from his own experience and that of his neighbors. For technical and market information, he relies on land grant colleges, state agricultural experiment stations, the U.S. Department of Agriculture, agribusiness firms and a wide range of agricultural magazines, journals, newsletters and radio services. The agricultural media are especially useful for market and weather information. Watching the weather, the U.S. farmer may not decide which crop to plant until the actual day of planting. As far as his equipment and experience permit he can shift from one crop to another to maximize yield and profits by responding to changes in the world market. He is not bound by a long-term production plan.

"A centralized agricultural system relying on Five-Year Plans cannot begin to match the flexibility and sophistication of a system built around the individual farmer."

Individual farmers making day-to-day decisions in response to market signals, changing weather and the conditions of their crops have a collective intelligence far exceeding that of a centralized bureaucracy, however well designed and competently staffed. Consider the simple example of fertilizer use. In the United States a farmer routinely tests the soil in each field and develops a fertilizer application plan according to the soil nutrient content and the crop to be grown there. He may decide to broadcast his fertilizer before plowing or after plowing, depending on the soil type and crop. He may decide to broadcast some of it and sidedress the remainder during the growing season. In some cases he may even resort to foliar application. But even this rather specific plan is revised as the season progresses. For example, a cold, wet spring may reduce the amount of phosphorous available to vegetable crops, requiring supplemental application. If the season is dryer than usual in corn growing regions, farmers may apply extra nitrogen in midsummer to help the crop withstand the late summer effects of drought.

A centralized agricultural system relying on Five-Year Plans cannot begin to match the flexibility and sophistication of a system built around the individual farmer. The Soviets already know how much nitrogen fertilizer they are going to use in 1984 because it is spelled out in the 1981-85 Five-Year Plan. An American farmer will not know how much nitrogen fertilizer he will use in 1984 until he tests his soil in the spring of that year and decides which crops to plant, and even then he may make adjustments as the season progresses. The fertilizer manufacturer will be expected to meet the farmer's demand. Indeed, the fertilizer firm's success depends on its ability to do so. But it is the farmer who determines how much of what kind of fertilizer is used, not the fertilizer manufacturer or a planning office in Washington.

Long-term planning and centralization handicap Soviet farm management in many ways. Equipment needs in a modern farm system are diverse and complex. A centralized system such as the Ministry of Tractor and Agricultural Machine Building in Moscow may simply lack the information to design the range of farm equipment needed to match the diverse needs of modern agriculture practiced under the

widely varying conditions of such a vast country. For example, one of the Ministry's farm equipment production units was responsible for developing 11 machines to combat soil erosion. It was able to develop only two. In 1981 *Ekonomicheskaya Gazeta* reported that of the 330 types of small-scale implements needed to grow fruit and vegetables on private plots only 140 were actually being manufactured. A lack of specialized equipment to properly apply chemical fertilizer is reducing fertilizer efficiency. According to reports from some areas less than half the phosphate and nitrogen fertilizer applied was actually available for plant use.[31]

Support for Soviet agriculture from the non-farm sector is generally inadequate. Despite the accelerated investment in farm equipment manufacture over the past three Five-Year Plans (1965-1980), Soviet agriculture is still plagued by defective equipment and poor maintenance. This helps explain the frequent Soviet press reports of planting or harvesting delays caused by equipment breakdown. To compensate for equipment defects, Soviet farmers have become expert at cannibalizing one piece of equipment for the spare parts needed to keep a similar piece running, leading to the sprawling equipment "boneyards" observed on state farms. Among the most revealing numbers published in Soviet statistical yearbooks are those showing that fewer tractors were in use at the end of 1981 than were manufactured between 1976 and 1981, indicating a short life expectancy.[32]

The situation contrasts sharply with the United States, where farm tractors are often still in use after 20 years. When a U.S. farmer buys a tractor from a farm equipment dealer, he purchases a package that includes servicing and maintenance. Implicit in this purchase is an understanding that the dealer will provide skilled maintenance, maintain an inventory of parts and otherwise insure a minimal "down time." If the dealer fails he will have difficulty selling the farmer any other farm equipment.

Paralleling the Soviet equipment shortfalls are those in the manufacture of pesticides. Having access to the right pesticide at the right time is often the key to controlling infestations of insects, diseases and weeds. Nonetheless, *Voprosy Ekonomiki* (Problems of Economics) reported in the summer of 1981 that the Soviet chemical industry

"The evolution of insect resistance shows little respect for the time lags of Five-Year Plans."

produced only 60 of the 144 chemical plant protection compounds recommended by the Ministry of Agriculture.[33]

Not only is Soviet industry unable to provide a full range of pest control chemicals, but Soviet planners do not expect industry to do so in the foreseeable future. More important, given the rapidity with which insects develop resistance to pesticides, a successful pesticide production program must constantly abandon older pesticides and adopt new ones. The evolution of insect resistance shows little respect for the time lags of Five-Year Plans. Without a flexible, responsive agricultural chemical industry and strong applied research programs that enable pesticide firms to continuously alter their products, farmers will frequently be helpless in fighting an insect infestation or a disease outbreak.

Underlying some of the Soviet crop production declines in recent years has been the cumulative soil erosion of the past several decades. The lack of a strong sense of stewardship among those working on state and collective farms has contributed to a severe erosion problem. Reports from the Soil Erosion Laboratory at the University of Moscow outline the dimensions of the problem. Measuring extreme degradation of the croplands in terms of gully formation, soil scientists at the Laboratory found that while only 2 percent of land in the south central part of the country now suffers from severe gullying, as much as 50 percent of the land could follow suit as efforts to intensify agriculture proceed.[34] Other research reports show similar threats in other regions. Soviet scholar Thane Gustafson of the Rand corporation observes that "fifty years of neglect have left a legacy of badly damaged soil."[35] Production quotas can apparently be at least as destructive to soils as the profit motive.

The erosion problem in the Soviet Union is aggravated by large, heavy equipment and vast fields that eliminate some of the natural boundary constraints on soil erosion by both wind and water. In the early eighties the official Soviet press carried pleas by soil scientists to the agricultural bureaucracy to arrest the loss of topsoil. Each year between five hundred thousand and 1.5 million hectares of cropland are abandoned, so severely eroded by wind they are no longer worth farming.[36] In early

1981, Dr. Vladimir Borovski, a prominent soil scientist and director of the Kazakh Institute of Soil Science, publicly charged the All-Union Academy of Agricultural Sciences with neglect of soil problems. In a broadcast on Moscow radio, Borovski said that Soviet agriculture will be retarded without effective soil management. His warnings have received some support at the highest levels of Soviet government, with Politburo member Mikhail S. Gorbachev urging planners to heed the advice of soil scientists.[37] But in short-term efforts to boost production, soil scientists are often ignored and responsible soil management practices are cast aside.

Soviet irrigation systems too are faced with widespread problems, including waterlogging and salinity. In part these problems arise from faulty design or construction. Construction teams eager to meet Plan goals at any cost sometimes omit drainage systems, which can quickly lead to waterlogging and salinity. During the early sixties irrigated land abandoned in Central Asia because of waterlogging and salinity equalled the amount of new land brought under irrigation. By 1971-75 the situation had improved markedly with newly irrigated land exceeding abandoned irrigated land by four to one in the Soviet Union as a whole.[38]

As a society industrializes and urbanizes, fewer people remain on the land, meaning that marketing systems must become more sophisticated, moving a larger share of farm products over longer distances from producer to consumer. Processing, packaging, off-farm storage and transportation all play key roles. A weakness in any one of these steps—a lack of packaging materials, inadequate storage or a lack of all-weather farm-to-market roads—can lead to waste.

In their single-minded focus on expanding food production the Soviets have neglected storage, packaging and transport. The Soviet press is filled with the resulting examples of waste: grain harvested but no place to store it; fields red with ripe tomatoes but no crates to transport them to market; potatoes left to rot because farm-to-market roads are impassable. Soviet scholar Marshall Goldman observes that, "The dearth of marketing facilities is a reflection of Marxist ideology, which regards marketing as a nonproductive, even parasitic activity."[39]

"With such an exodus of young people, the Soviet rural labor force is not only thinning, but graying as well."

Beyond the disadvantages of centralized agricultural planning, Soviet agriculture provides little incentive for those who work on the land. A group of young American farmers, who had worked on Soviet collective farms as part of an exchange program, were amazed to see workers leave their tractors promptly at five o'clock, regardless of circumstances. Planting could be weeks behind schedule, or a harvest could be threatened by a coming storm, but it made little difference. The mentality was that of factory workers leaving their shifts, not that of farmers.[40] This would never happen in Iowa or Kansas. Farmers there would work around the clock if necessary to get their corn, soybeans or wheat planted. Everyone—husband, wife and children old enough to handle the equipment—would take a turn.

25

Soviet agriculture is facing serious human resource problems as well. Given the rather dreary life in the countryside, the more resourceful and ambitious young people have been migrating to the cities where there are industrial labor shortages and where the lights are much brighter. In a study of rural-urban drift, Soviet economist B.N. Khomelyansky reports that 15 million workers left collective and state farms for the cities during the seventies. The overwhelming majority were young men and women, well above average in skills, approaching their prime productive years.[41] With such an exodus of young people, the rural labor force is not only thinning, but graying as well. The aging population left on the land may simply lack the energy and motivation to further raise productivity.

Growing Soviet Food Imports

During the early twentieth century the Soviet Union was Europe's principal source of wheat. As recently as the late thirties the Soviet Union and Eastern Europe exported five million tons of grain per year, the same as North America. After World War II the Soviet Union again produced modest surpluses. But beginning in 1963 Moscow turned to the outside world for grain, becoming an intermittent importer. Since 1972 it has been a regular importer.[42]

In recent years the Soviet Union has become the world's leading grain importer, with imports nearly twice those of Japan, which ranks

second. Soviet grain imports are four times India's peak grain imports, which occurred in 1966 and 1967 following two consecutive monsoon failures. Beginning in 1979 the Soviet harvest shortfall reached record proportions as the Plan goals increased and production declined. Over the past four years, harvest shortfalls have totalled 48, 46, 71 and 68 million tons respectively.[43]

26

Falling farm production across the board is translating into rising imports of all basic foods, including meat, butter, vegetable oils, sugar and soybeans. (See Table 3.) Meat imports, mostly beef, have climbed from 170,000 tons per year in the early seventies to over a million tons per year in the early eighties. With an estimated 1.1 million tons of meat imports in 1982, the Soviet Union now leads the world in net imports of meat as well as grain. Using the U.S. feedlot

Table 3: Principal Soviet Agricultural Imports, 1970-82

Trade Year	Total Grains	Oilseeds	Meat	Sugar	Edible Veg. Oils
			(1,000 metric tons)		
1970	1,283	43	165	3,006	34
1971	755	45	225	1,539	34
1972	7,783	482	131	1,906	30
1973	21,776	768	129	2,822	23
1974	10,989	70	515	1,874	19
1975	5,230	424	515	3,240	27
1976	25,650	1,827	362	3,726	98
1977	10,300	1,455	617	4,745	84
1978	18,362	966	184	3,993	108
1979	15,063	1,814	611	4,060	199
1980	30,525	1,155	821	4,895	357
1981	34,000	1,459	980	5,126	604
1982[1]	46,000	2,100	1,100	6,000	800

[1]Preliminary.

Source: USDA Foreign Agricultural Service, Economic Research Service, and Worldwatch Institute estimates.

"Fear of social discord might explain why Brezhnev described the Soviet food problem as both economic and political."

conversion ratio of seven pounds of grain per pound of beef, 1982 meat imports represent nearly eight million tons of imported grain.[44]

As the seventies began, Soviet oilseed imports were negligible, but with sunflower seed production declining since 1974, oilseed imports, largely soybeans, have averaged over 1.5 million tons yearly during the early eighties.[45] If efforts proceed to increase the efficiency of grain used in livestock rations by incorporating more protein, even more soybeans will be needed.

Imports of kitchen staples such as vegetable oils and sugar are also rising. As with oilseeds, vegetable oil imports in the early seventies were negligible, but in the early eighties they are averaging over a half million tons annually. Imports of edible animal fats that can be used interchangeably with vegetable oils for cooking, such as butter, are also rising. Sugar imports, already heavy in the early seventies, are reaching new highs in the early eighties.[46]

Rising farm imports will inevitably strain the Soviet supply of foreign exchange. In 1982, for example, the Soviets are importing 25 million tons of feedgrains at roughly $120 per ton, including ocean freight, forcing a hard currency outlay of $3 billion. Eighteen million tons of wheat costing nearly $200 per ton, including freight, add $3.6 billion to the bill. These two purchases alone total some $6.6 billion in the current year.[47] They come at a time when oil and gold prices have fallen, and when the Soviets are having difficulty maintaining oil export levels to hard currency economies outside Eastern Europe.

Massive imports may be economically draining as well as politically embarrassing, but in practical terms the Soviet government has little choice. Numerous work stoppages and consumer protests in the Soviet Union have been reported over the last three years. For the Soviet leadership, worker unrest is a worrisome issue given the widely recognized role of meat shortages in kindling worker unrest in Poland in 1980 and 1981. Fear of social discord might explain why Brezhnev, at a meeting of the Communist Party Central Committee in November 1981, described the Soviet food problem as both economic and political. Brezhnev's concern indicates that even though grain

shortages are likely to continue well into the future, the Soviet Union will rely on imports to fill the gap.

28 In an earlier age the Soviet leadership would not have felt so pressured to import food. But in the less repressive post-Stalinist era the Soviet leadership bases its legitimacy in part on its ability to satisfy the aspirations of the Soviet people for a better life. This includes a better diet, symbolized by more meat. The current crisis in agriculture, if not resolved, will threaten this self-defined legitimacy.

The Soviet leadership felt the need to respond to agricultural shortfalls even before the disastrous 1981 harvest. In October 1980, just before the Eleventh Five-Year Plan began, Brezhnev first alluded to a forthcoming "food program" that would combine production and distribution of farm products "from farm to store" in an integrated agro-industrial complex.[48] At the meeting of the Communist Party's Central Committee on May 24, 1982, Brezhnev spelled out details of the plan, promising both new structures and additional infusions of capital. He proposed agricultural associations at the district (county) level that would integrate agricultural production with both the agro-service and agro-processing industries.[49] This alternative structure, however, will threaten both the traditional authority of the ministries in Moscow and that of existing local Party organizations. It will add still more bureaucratic layers and may generate confusion between this alternative structure and the existing ones. The plan suggests a troubled leadership grasping at straws, not one that is prepared to undertake the fundamental reforms required to reduce food deficits.

As attempts to fine tune the Soviet agricultural system fail to produce desired results, the Soviet leadership will be increasingly pressured to consider structural reform. A possible model for such reform can be found in Hungary. In the sixties, the centralized Hungarian agricultural system began to deteriorate. Grain production stagnated and Hungary too became a grain deficit country, importing several hundred thousand tons of grain per year.

Faced with mounting debts to the West and lacking the natural resources that the Soviet Union has exported to pay its bills, the Hungarians were forced to reform their economic system. One of the first

"Fixing the ills of Soviet agriculture without reforming the system will be like treating the symptoms of an illness rather than the cause."

steps—basing domestic prices on world prices—was an integral part of the Hungarian "New Economic Mechanism" adopted in 1968. Painful at first, this helped trim waste and inefficiency.[50]

To decentralize its agriculture, Hungary began by converting agricultural cooperatives formed in the original collectivization into self-managing cooperatives. Eric Bourne, East European correspondent for the *Christian Science Monitor*, reports that at the same time, old, ideologically motivated restrictions on small farming and private plots were swept away. Adopting a pragmatic approach, the Hungarian government now actively supports small farms with technical assistance and material incentives.[51]

Willing to experiment, Hungarian officials have successfully revitalized their agriculture. By 1980 grain production had doubled that of the early sixties. Not only has surging grain production led to a consumption of meat products that is among the highest in Eastern Europe, but Hungary is once again exporting grain. Since 1973 grain exports have averaged over a million tons annually, providing a welcome source of foreign exchange.[52] A proportionately successful recovery of Soviet agriculture would create an exportable grain surplus of some 20 million tons.

Soviet leaders may not yet have studied agricultural modernization elsewhere enough to see the inherent conflict between a centrally-planned agriculture and a highly productive agriculture. So far they have only attempted to improve the existing system, rather than turn away from centralized planning and control. But the problem is not that Soviet planners are unintelligent or that the Soviet farm labor force is lazy and inept. It is the faulty design of the system itself. It does not work effectively and cannot be expected to. Fixing the ills of Soviet agriculture without reforming the system will be like treating the symptoms of an illness rather than the cause. In agriculture, as in medicine, the risk in such an approach is that the patient's condition may worsen.

The U.S.-Soviet Food Connection

30 Each day two 20,000-ton freighters loaded with grain leave the United States for the Soviet Union. The flow of grain between these two major adversaries, something neither government had planned on, is influenced by economic considerations such as the size of the Soviet grain deficit, the U.S. capacity to supply and the Soviet ability to pay. Political considerations include the risk to both trading partners associated with being heavily dependent on each other, whether as a supplier or a market.

Soviet grain purchases during the late sixties and early seventies were intended largely to offset poor harvests in the marginal rainfall areas of the Virgin Lands. More recently grain imports have offset the consistently large differences between planned production and actual harvests. Somewhat surprisingly, the amount of grain imported by the Soviets since their agriculture began to deteriorate has become more predictable.

Because of the massive scale of Soviet food imports the United States necessarily figures prominently as a source of food. Indeed, no country has ever dominated world grain trade as the United States does today. Its 55 percent share of world grain exports in 1981 easily overshadows Saudi Arabia's 32 percent share of world oil exports.[53] And while the amount of oil traded internationally has been falling since 1979, grain shipments are continuing to grow.[54]

By the early eighties, U.S. grain exports dwarfed those of the other principal suppliers—Canada, Australia, Argentina and France. Annual grain exports from each of these countries now typically range from 11 to 24 million tons compared with over 110 million tons from the United States. Collectively, these four countries are exporting some 75 million tons per year.[55] (See Figure 4.)

From 1972 until 1980 the United States supplied on average 61 percent of Soviet grain imports. With the partial export embargo imposed by the United States in early 1980 following the Soviet invasion of Af-

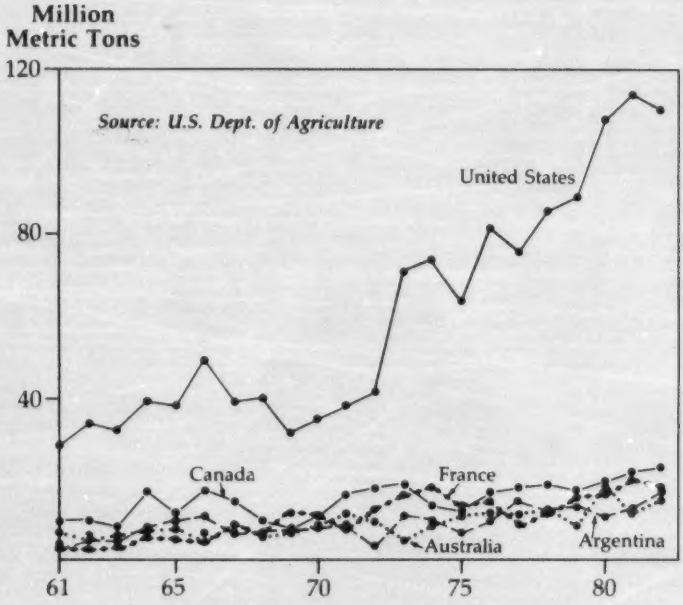

Figure 4. Total Grain Exports, Major Exporting Countries, 1961-1982

ghanistan, the U.S. share fell to 24 percent. As the Soviets were forced to seek grain elsewhere, Argentina emerged as the leading Soviet supplier in 1980. When the U.S. embargo was lifted in April 1981 Soviet imports from the United States began to rise again, nearly doubling the eight million ton flow permitted under the partial embargo.[56] (See Table 4.) At 17.8 million tons, the 1982/83 estimated U.S. grain shipments to the Soviet Union rival those going to Japan. If Soviet imports continue to be heavy and if the U.S. share of the market continues to expand, moving toward the preembargo level,

the flow of grain from the United States to the Soviet Union will shortly become the largest flow of food between two countries in history.

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Table 4: Soviet Grain Imports by Source, 1975/76 to 1982/83

	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83[1]
	(million metric tons)							
United States	13.9	7.4	12.5	11.2	15.2	8.0	15.3	17.8
Canada	4.5	1.4	1.9	2.1	3.4	6.8	8.7	10.2
Australia	2.0	.5	.3	.1	4.0	2.9	2.6	2.0
Argentina	1.4	.3	2.7	1.4	5.1	11.2	13.2	11.0
European Community	.5	.2	.2	.2	.9	1.5	2.5	2.0
Others	3.0	.3	.8	.1	1.8	3.6	2.7	3.0
Total[2]	25.7	10.3	18.4	15.1	30.4	34.0	45.0	46.0

[1]Preliminary: U.S. estimates by USDA; other countries by Worldwatch. [2] Column totals may not add because of rounding.
Source: U.S. Department of Agriculture

The U.S. embargo distorted normal grain trade patterns as the Soviet Union turned to other suppliers, all quite small compared with the United States. Tying up the lion's share of exportable supplies from countries such as Argentina, the Soviet Union forced Japan and other major importers to rely even more heavily than usual on the United States. As a result, U.S. restrictions on grain shipments to the Soviet Union effectively altered not only Soviet sources of supply but the entire world pattern of grain trade. The partial embargo did not measurably reduce the amount of grain imported by the Soviets, but it did make grain imports more difficult and somewhat more costly. It also let the Soviets know that food would be used as an instrument of foreign policy.

The current flow of grain from the United States to the Soviet Union takes place within the framework of the U.S.-Soviet Grains Agreement signed in October 1975. Initially a five-year pact that ran from October 1976 to September 1981, it was extended for one year in

August of 1981. The United States delayed negotiations, scheduled to begin in early 1982, on a new long-term grain agreement in response to the Soviet Union's role in Poland. In late July 1982, the United States offered another one-year extension of the agreement rather than a new agreement, expressing its displeasure over martial law in Poland. After pondering the proposed one-year extension for a few weeks, the Soviets decided to accept it even though they would have preferred the security of a multi-year agreement.[57]

The Grains Agreement requires that the Soviet Union annually purchase a minimum of six million tons of corn and wheat in roughly equal quantities. It also allows the Soviets to purchase up to eight million tons if needed, but purchases over eight million tons require consultations between the two countries and special permission by the U.S. government. In any year that the U.S. Department of Agriculture estimates the combination of U.S. production and carryover stocks to be less than 225 million tons, the United States may reduce the amount available to the Soviets below the minimum called for.[58]

The original agreement was made when the Soviets were far more hopeful about their long-term food prospects than they are today. As a result, purchases have invariably greatly exceeded the eight million ton maximum automatically permitted in the agreement, requiring numerous consultations from 1976 on. Nonetheless, the agreement has helped stabilize the world grain market.

As the Soviets attempt to improve the balance between starch and protein in livestock rations, they are importing more soybeans and soybean meal for feeding purposes. As livestock feeding becomes progressively more sophisticated, this growth is likely to continue. Interestingly, the United States dominates world exports of soybeans even more than cereals, accounting for some two-thirds of all soybean exports. (See Figure 5.)

The Soviets have a natural preference for buying basic commodities in the U.S. market, as their grain purchase patterns before the 1980 embargo show. The United States has year-round warm water ports, something Canada lacks, and these ports can handle freighters in the

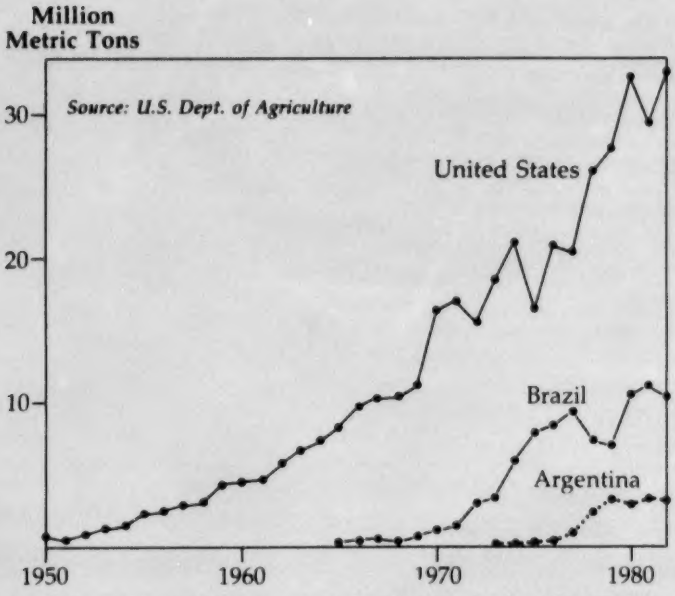

Figure 5: Soybean Exports, Major Exporting Countries, 1950-1982

100,000-ton class. The United States is also geographically closer to Soviet ports than either Australia or Argentina, which lowers transportation costs. With massive Soviet grain imports straining the capacity of their ports, an even flow of grain is essential and easier to maintain from a single large supplier than from several smaller ones.

Ultimately, constraints on Soviet food imports may hinge on the country's ability to earn foreign exchange. The Soviet Union now depends heavily on export earnings from oil, natural gas and gold. Eventually it will lose its exportable surplus of oil and gold, and with

it key sources of hard currency. Unless the Soviet Union develops a competitive industrial capacity, something it has not yet done on any meaningful scale, foreign exchange shortages could ultimately limit its food imports.

This limited capacity to earn foreign exchange is more likely to restrict Soviet food imports than is the U.S. ability to supply. The yield-raising technologies on which U.S. agriculture depends to boost food output are continuing to advance, though more slowly than in the early postwar decades. In addition, there is extensive potential for double cropping that farmers are now systematically exploiting.[59]

Of the various long-term constraints on U.S. food exports, soil erosion is perhaps the most serious. As the world market for U.S. grain has expanded, the resulting intensification of agriculture, particularly continuous row cropping on sloping lands in the Midwest and Southern states, has led to a rate of soil loss that is undermining long-term productivity on 34 percent of U.S. cropland. The Soil Conservation Service has identified 17 million acres of land now in crops (4 percent of the total) that are losing topsoil so fast they should be converted to grassland or forest before they are rendered worthless.[60] Without government programs to convert this land and to help farmers adopt terracing, strip cropping, minimum tillage or other conservation measures on the rapidly eroding lands, farmers, facing the severe cost-price squeeze imposed by the market, may not be able to arrest the loss of topsoil and maintain the inherent productivity of their land. The U.S. Soil Conservation Service estimates that an adequate soil conservation program would cost roughly $2 billion a year, twice what the United States now spends to protect its soils. But that cost is small compared to the value of farm exports, now totalling over $40 billion per year. In the absence of effective leadership from Washington on this issue, U.S. farm exports to the Soviet Union amount to a subsidy of Soviet farm inefficiency paid with U.S. topsoil.

Fresh water shortages may also restrict long-term growth in U.S. farm output. For example, in the southern Great Plains, depletion over the next few decades of the Ogallala Aquifer, an underground source of fresh water stretching from southern Nebraska to northern Texas,

will force a conversion from irrigated agriculture back to dry-land agriculture. As the conversion progresses land productivity in this region will decline accordingly.[61]

These threats to agricultural productivity notwithstanding, U.S. export capacity is likely to expand further in the years ahead as land productivity increases and as the double-cropped area expands. If the administration does not respond to the threat of massive soil erosion, Congress may take the initiative. In addition, the growing popularity of minimum tillage, a practice designed initially to reduce fuel use, is inadvertently reducing soil erosion.

In the new commercial food relationship between the two superpowers dependence is mutual, but it is not symmetrical. Soviet dependence on U.S. supplies, directly or indirectly, is greater than U.S. dependence on Soviet markets. Whether or not the Soviets import directly from the United States, U.S. export capacity makes Soviet imports possible. For the United States, an embargo on grain exports to the Soviet Union would eliminate direct shipments but would not likely have much effect on total U.S. exports. If Canada and Australia were to join the embargo, as they might in an emergency, then Soviet imports would be reduced, as would overall U.S. grain shipments. In this event, the United States government could idle cropland by supporting farm prices. This technique has been widely used since World War II and was reintroduced on a limited scale in 1982.

The Effect on U.S.-Soviet Relationships

The new food connection between the United States and the Soviet Union may represent the most important change in relations between the two countries since the Cold War began a generation ago. It demonstrates in clear economic terms that the United States and the Soviet Union need each other. This is particularly true at a time when the productive capacity of U.S. farms continues to climb while growth in grain markets outside the Soviet Union has slowed because of a sluggish economy worldwide. The record grain deficits of the early eighties in the Soviet Union show more than ever its dependence on U.S. agriculture.

"The new food connection may represent the most important change in relations between the two countries since the Cold War began."

Whether or not the Soviets import their grain directly from the United States is not the relevant issue. The vast U.S. grain exports, over 110 million tons per year in recent years and 55 percent of the world total, are what enable the Soviets to import record quantities of grain. If U.S. export capacity had not doubled over the past decade, there would not be nearly enough grain to meet all world import demands at current prices, and certainly not enough to support the growth in Soviet imports.

Although American farmers are the most outspoken advocates of trade with the Soviet Union, the higher level of farm exports that Soviet imports make possible benefits the entire U.S. economy. As the U.S. oil import bill soared after the 1973 price increases, the enormous growth in farm exports paid much of the bill. Traditional export industries, such as automobiles, have sagged in international competition. Even high technology exports, such as commercial jet aircraft, are suffering.[62] In a stagnant economy the productivity and ingenuity of American farmers have helped the United States balance its international payments.

Great as the benefits of this expanded farm trade are for the United States, the Soviet Union has even more to gain. One can only imagine how long the lines would be at Soviet meat counters had it not been for U.S. grain. The Soviet Union is in deep trouble economically because it must import so much food, but it would be in even deeper trouble politically if the food were not available.

Both superpowers at times feel uneasy with their new trade dependency because it complicates a traditional adversarial relationship. The food connection does not ensure peaceful relations between the two countries, but it will make massive arms spending more difficult to justify. The American people and Congress may increasingly doubt that a country depending on the United States for so much of its food could be as dangerous as commonly portrayed. Hard-liners in the Soviet Union may be unable to convince Kremlin colleagues that the country which is feeding them is indeed a mortal enemy.

The evolution of U.S.-Soviet agricultural trade is a reminder that in the long run economic forces tend to override political considerations. With another bumper grain harvest likely in 1982, the United States will need Soviet markets more than ever. Indeed, U.S. Secretary of Agriculture John Block, eager to bolster farm income, has implored the Soviets to buy more U.S. grain.[63]

Internal stability within the Soviet Union, as well as in the Soviet Bloc, may depend more on grain imports than any other external factor. If the Reagan administration is serious about putting pressure on the Soviet Union, as it argues in opposing the pipeline, it should urge a joint embargo with U.S. allies Canada and Australia of all grain shipments to the Soviet Union. This would provide real and immediate economic pressure, but no such effort has been made. Instead, President Reagan has promised American farmers that the Soviets in 1982 will receive the biggest shipment ever of U.S. grain.[64]

In the absence of such an effort to press the Soviets, the Reagan administration arguments against the Yamal gas pipeline from northern Siberia to Western Europe sound insincere and unconvincing. In the short run, forgoing the pipeline would deny the Europeans industrial exports and employment, much as a grain embargo would deny American farmers a market. In the long run, failure to build a pipeline would deny West Europeans needed energy and a more diverse supply.

Arguing against the 3,500 mile gas pipeline, Reagan notes that U.S. grain sales drain the Soviet Union of hard currency, while the pipeline will boost Soviet money supplies. But if the United States is unwilling to wield grain as an economic weapon against the Soviets (and face the consequences at home), its pipeline stand is unfair to Western Europe. Pipeline opposition also ignores eventual advantages to the United States. For U.S. farmers, earnings from the pipeline will eventually allow the Soviets to buy more U.S. wheat, feedgrain and soybeans than they otherwise could. If U.S. agriculture seeks foreign markets in the late eighties as eagerly as it currently does, the pipeline is a welcome development, something the United States should support rather than oppose.

The key decisions affecting the long-term fate of this new economic relationship between the superpowers are more likely to be made in Moscow than in Washington, as the Soviets endeavor to improve their agriculture. Soviet officials may not yet realize that the agricultural modernization they want is incompatible with centralized planning and management. If not, they will keep tinkering with the system, trying to make it work. One inevitable consequence of following this path will be declining morale among farm workers as frustrations with the inherent defects of the system mount. Without corrective action the Soviets face continued food shortages, rationing and longer waits at the market. More broadly, shortages of high quality foodstuffs, especially meat, will lower worker morale throughout Soviet society.

A second Soviet option is to launch economic reforms similar to those in Hungary, where managers in both industry and agriculture are relatively free of central control and have wide latitude to make independent decisions. No modest adjustments the Soviets can make, however, such as giving private farm plots more support, will arrest the broad-based deterioration. Only fundamental reforms, perhaps as great as any since the Communist Party came to power in 1917, will be adequate.

There are signs that the Soviet leadership is looking carefully at the Hungarian experience. Hungarian poultry producers are now aiding their Soviet counterparts, using techniques the Hungarians acquired from the West. Soviet Prime Minister Nikolai Tikhonov visited Hungary to examine firsthand the Hungarian successes and, in so doing, gave an implicit stamp of approval. Whether this interest will translate into Soviet decentralization along Hungarian lines remains to be seen.[65]

Given the complex interaction between modern agriculture and the rest of the economy, the farm economy cannot be reformed in isolation. It can succeed only as part of a restructuring of the entire economy. In assessing the prospects, *Washington Post* correspondent Dan Morgan notes that, "extensive economic reforms on the Hungarian model pose political risks for entrenched communist power struc-

tures. They imply a willingness to tolerate a more decentralized, disorderly system in which economic decisions are made by thousands of factory managers, small-scale entrepreneurs and farmers, not just a few party officials and bureaucrats."[66]

In effect the Soviet leadership faces two hurdles enroute to a productive agriculture: the decision to reform and the implementation of the reform. Launching reforms like those in Hungary will be far more difficult in the Soviet Union, with its longer bureaucratic tradition. Those now in power cannot remember working within a market economy, and farm workers accustomed only to taking orders cannot develop overnight the decision-making skills essential to successful decentralized agriculture. Robert Laird of Columbia University notes that previous Soviet reform efforts "just fizzled out in the soggy mass of bureaucracy."[67]

For the United States, policy options are less clear-cut. The shift in the agricultural power balance in favor of the United States provides an opportunity to reshape relations with the Soviet Union. When two powers are evenly balanced it is difficult for either side to take major initiatives. Now that the balance has been decisively altered in the strategically important food sector, the United States can proceed from a position of strength.

While unfortunate for the Soviets, the deterioration of their agriculture does present a timely opportunity to lessen tensions between Washington and Moscow. An obvious beginning for the Reagan administration would be to slow down the arms race. Identified in the U.S. public mind as a Soviet hard-liner, President Reagan is well-positioned to engage the Soviets in serious discussions of reductions in both nuclear and conventional weapons. Just as hard-liner Richard Nixon was able to reopen the door to China and in so doing ensure a place in history, Ronald Reagan can lead U.S.-Soviet relations into a new era. In the absence of a successful major foreign policy initiative, the Reagan administration's principal claim to a chapter in the history books may be its generation of the largest U.S. budget deficits ever recorded.

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Conditions within the Soviet Union suggest that the Soviets will respond to U.S. initiatives that would lessen international tensions and permit the Soviets to focus on internal reforms. In his missile-freeze speech in early 1982, President Brezhnev said, "We have not spent, nor will we spend, a single ruble more for these purposes than is absolutely necessary." As Soviet analyst Marshall Goldman notes, this departs from past statements, since Soviet leaders normally omit cost considerations when discussing military matters, and it may well reflect a Soviet interest in reordering priorities.[68]

For the United States the question is how to use this new advantage most effectively to reduce tensions between the two countries. Using food as a lever in U.S.-Soviet relationships requires an understanding of its limitations. While a joint grain embargo by the United States, Canada and Australia could check more radical Soviet military actions, access to the U.S. exportable grain surplus cannot easily be put on the arms reduction negotiating table along with tanks in Europe and nuclear warheads. For the Soviets it is embarrassing enough to import four times as much grain as India imported after its worst monsoon failure. To spotlight this shortcoming by directly linking it to arms reductions would be an unacceptable affront to Soviet national pride.

The Soviets have already indicated that they will resist the U.S. use of food for political purposes. In his May 24, 1982 address outlining the new "food program," President Brezhnev noted that "The leadership of certain states is striving to turn ordinary commercial operations such, for example, as grain sales, into a means of putting pressure on our country, into an instrument of political pressure."[69] This preemptive rhetoric, not needing to mention the United States by name, shows that the Soviets are fully aware of their dilemma, but will not easily bend to pressure.

The advantages of massive U.S. food shipments to the Soviet Union are not limited to economic benefits alone. These shipments are an important commercial transaction for the United States, but they also provide a form of insurance against a Soviet nuclear attack. Although the prospect of destroying its principal source of imported food will

not necessarily prevent a Soviet nuclear attack, it is certainly a deterrent. Unlike a U.S. grain export embargo that would simply rearrange trade patterns, a nuclear attack that destroyed U.S. export capacity would decimate the world's exportable grain supplies, particularly since Canada's export capacity might also be destroyed. This would leave over a hundred grain importing countries, including the Soviet Union, scrambling for the exports of Australia and Argentina, plus a few other small exporters.

While reducing tensions is obviously attractive to Moscow, there are significant advantages for Washington as well. Rising military spending is pushing budget deficits to record levels. In 1982, for the first time in U.S. history, the soaring public debt has pushed public borrowing above private borrowing, including that by both businesses and consumers.[70] This competition for capital from the U.S. Treasury has driven up interest rates and restricted corporate investment and consumer spending. The result has been economic stagnation, the highest unemployment in 40 years and more farm and business failures than at any time since the Great Depression. In these circumstances, any budget relief would be welcome. But balancing the budget and reducing public borrowing depend on cuts in defense spending, pegged at a record $263 billion in fiscal year 1983.[71] Defense budget cuts in turn depend on substantial progress in arms reduction negotiations with the Soviet Union.

Countries worldwide also have an interest in reduced tensions between the superpowers. The Third World has a stake in Soviet reforms that would reduce its claims on the world's exportable food supplies. Recent Soviet grain purchases, though heavy, have not driven prices skyward as they did in the mid seventies. But shortages could easily reemerge with the next poor world harvest, as they did in 1972, when food shortages raised death rates in India, Bangladesh and the Sahelian zone of Africa.

The Third World also has an economic interest in nuclear disarmament by the superpowers. Anything that reduces the threat of nuclear war benefits the more than 100 countries depending on U.S. grain exports.

In the event of a U.S.-Soviet nuclear exchange, more people may die of starvation in the South than of radiation in the North.

The food connection between the two superpowers will not automatically usher in a new period of East-West cooperation and peace. But if wisely used, it could become the cornerstone on which to build a better relationship. The food connection between the two superpowers promises other changes in the long run. Frequent consultations under the grain agreement could lead to consultations in other areas as well. Just as the two countries now find it in their mutual interest to engage in massive food trade, they may also find it advantageous to cooperate in nonagricultural trade, scientific research and even space exploration.

The importance of the dramatic shift in the agricultural balance of power lies less in the potential it provides for using food as a political lever than in the psychological effect the new commercial ties will have on political relations between the two countries. The long line of grain-laden ships linking U.S. farmers to Soviet consumers represents a major new economic tie between the two countries, one that could transform long-term political relationships as well.

Notes

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